

**REMARKS**

Claims 1-10 are pending in the present application. The specification (page 4) and Claims 1, 3-6 and 8-10 have been amended. As will be discussed below, no new matter has been added. Accordingly, entry of the present Amendment is requested.

Claims 6-10 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 6,376,633 to Yamamoto *et al.*

It is asserted that Yamamoto teaches each limitation of Applicants' Claims 6-10. With respect to dependent Claims 9 and 10, it is asserted that "since the polymers of Yamamoto are identical to those instantly claimed, and since they are made by essentially the same process, as instantly claimed, the polydispersity characteristic of the Yamamoto polymers will be inherently identical to those instantly claimed."

Applicants respectfully traverse this rejection for the following reasons.

Yamamoto discloses a process for preparing acrylic pressure-sensitive adhesive compositions which includes radical-polymerizing monomers containing an alkyl (meth) acrylate using carbon dioxide as a diluent. The pressure-sensitive adhesive composition contains an acrylic polymer having a weight average molecular weight of 400,000 or more. Referring to col. 3, lines 8-14, polymerization may be conducted in carbon dioxide under a pressure regulated to, for example, about 5.73 to 40 MPa in a temperature range of, for example, about 20 to 100°C. The polymerization can be conducted in carbon dioxide in a supercritical state, and the polymerization time is usually about 2 to 20 hours.

However, Yamamoto does not teach or suggest the step of continuously feeding a monomer mainly comprising one or more alkyl (meth)acrylates, a polymerization initiator and carbon dioxide to a continuous reactor through a mixer and performing continuous polymerization at a temperature and for a residence time within the presently claimed polymerization temperature and residence time, in a continuous reaction zone of a reactor. Referring, for instance, to Examples 1 and 2 of Yamamoto, they do not refer to a continuous reactor including a mixer or performing continuous bulk polymerization in a continuous reaction zone of a reactor.

In view of the foregoing, Applicants respectfully submit that the embodiments of the present claimed invention recited in Claims 6-10 are not anticipated by Yamamoto. Accordingly, withdrawal of this rejection is requested.

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamamoto.

However, Applicants respectfully submit that an obvious rejection based upon Yamamoto is not appropriate. Yamamoto qualifies as prior art to the present invention under 35 U.S.C. § 102(e). As such, it cannot be used in an obviousness rejection under 35 U.S.C. § 103. Such a rejection is precluded by 35 U.S.C. § 103(c) which states that "subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of §102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person." Accordingly, Applicants

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submit herewith copies of the recorded assignments for both the present application and for U.S. Patent No. 6,376,633 to demonstrate that Yamamoto and the present application, at the time the invention was made, were both owned by Nitto Denko.

Additionally, Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over either U.S. Patent 6,444,772 to McGinnis *et al.* or U.S. Patent 6,224,938 to Bamba *et al.*

Both McGinnis and Bamba are relied upon to assertedly teach each limitation of Applicants' Claims 1-10 with the exception of the presently claimed polymerization time (Claim 1 recites a residence time of 0.5 to 60 mins. and Claim 6 recites a residence time of 60 to 200 mins.).

Applicants respectfully traverse this rejection for the following reasons. McGinnis issued September 3, 2002, based upon an application (Appln. Serial No. 09/181,456) filed October 28, 1998. Accordingly, McGinnis qualifies as prior art in the present application under 35 U.S.C. § 102(e). Thus, Applicants submit herewith evidence of common ownership of McGinnis and the present application (copies of the recorded assignments) in view of which the portion of the rejection based upon McGinnis should be withdrawn.

Bamba discloses a method of continuously feeding raw materials for a pressure-sensitive adhesive (starting monomer, polymerization initiator, and the like) and a pressurized inert fluid, and continuously polymerizing monomers in an extruder.

However, Bamba does not teach or suggest the step of uniformly mixing a monomer mixture and an inert fluid and feeding the resulting mixture to a continuous reactor, as presently claimed. Of course, even if a monomer mixture and an inert fluid are directly fed to an extruder

and are heated, polymerization proceeds. However, since the polymerization proceeds with the reaction system being heterogeneous, it is difficult to obtain a polymer containing a low amount of a low molecular weight component, which is the desired effect of the present invention (*see*, for example, dependent Claims 4, 5, 9 and 10) and a polymer having a broad molecular weight distribution is formed.

In view of the foregoing, withdrawal of this rejection is requested.

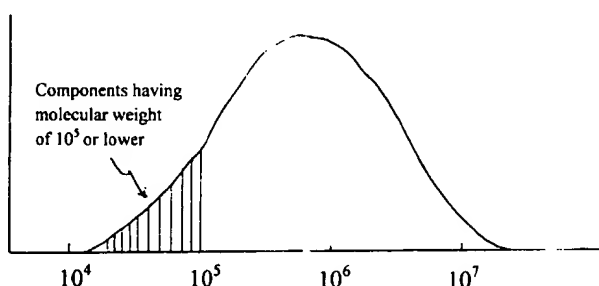
Additionally, as referred to above, the specification has been amended at page 4. This amendment (as well as the corresponding amendments to dependent Claims 4, 5, 9 and 10) corrects an inadvertent error in referring to the molecular weight of the low molecular weight components as a "weight average". The molecular weight of the components should simply be defined as a "molecular weight", not as a "weight average" molecular weight. The reason for this is set out below.

A molecular weight is a measure showing a size of a molecule, and in the case of a specific molecule, its molecular weight is unequivocally determined (for example, methanol: 32, ethanol: 46, etc.).

On the other hand, a polymer is an aggregate of molecules having different degrees of polymerization, and comprises molecules having various molecular weights. Therefore, a molecular weight of a polymer having a specific degree of polymerization can clearly be expressed, but to express a molecular weight of a polymer as a whole, an average value of those molecular weight is employed, and a "weight average" molecular weight is one expression for an average value.

The meaning intended throughout the specification and claims is the amount of polymer molecules having a molecular weight of  $10^5$  or lower that are present with respect to the entire polymer (*see*, GPC chart below). In other words, the molecular weight of  $10^5$  is a molecular weight of the individual polymer (*i.e.*, a border line).

GPC chart: weight average molecular weight =  $10^6$



Each of the examples of the present application provide support for the amendments to page 4 of the specification and Claims 4, 5, 9 and 10. Each example states the proportion of components "having an Mn of 100,000 or less". *See*, for example, page 11, lines 1-3, with respect to Example 1.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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**APPENDIX**  
**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION:**

**The specification is changed as follows:**

**Page 4, delete the first full paragraph and insert the following paragraph:**

The present invention provides a process of producing an acrylic pressure-sensitive adhesive comprising continuously feeding a monomer mainly comprising at least one alkyl (meth)acrylate, a radical polymerization initiator and carbon dioxide to a continuous reactor through a mixer and performing continuous bulk polymerization at a polymerization temperature of 50 to 180°C for a residence time of 0.5 to 200 minutes in a continuous reaction zone of the reactor. The present invention also provides an acrylic pressure-sensitive adhesive obtained by the process. The acrylic pressure-sensitive adhesive comprises preferably 10% by weight or less, more preferably 6.5% by weight, based on the weight of the total monomers, of components having a [weight average] molecular weight of 100,000 or less.

**IN THE CLAIMS:**

**The claims are amended as follows:**

1. (Amended) A process of producing an acrylic pressure-sensitive adhesive comprising: [continuously feeding a monomer mainly comprising at least one alkyl (meth)acrylate, a radical polymerization initiator and carbon dioxide to a continuous reactor through a mixer and]

feeding a monomer solution comprising a mixture of an alkyl (meth)acrylate monomer and a radical polymerization initiator, and carbon dioxide to a joint block equipped with a line mixer;

mixing the monomer solution and carbon dioxide in the joint mixer;

feeding the resulting mixture to a continuous reactor; and

performing continuous bulk polymerization at a polymerization temperature of 50 to 180°C for a residence time of 0.5 to 60 minutes in a continuous reaction zone of said reactor.

3. (Amended) An acrylic pressure-sensitive adhesive obtained by [the process as claimed in claim 1] a process comprising

feeding a monomer solution comprising a mixture of an alkyl (meth)acrylate monomer and a radical polymerization initiator, and carbon dioxide to a joint block equipped with a line mixer;

mixing the monomer solution and carbon dioxide in the joint mixer;

feeding the resulting mixture to a continuous reactor; and

performing continuous bulk polymerization at a polymerization temperature of 50 to 180°C for a residence time of 0.5 to 60 minutes in a continuous reaction zone of said reactor..



4. (Amended) The acrylic pressure-sensitive adhesive as claimed in claim 3, which comprises 10% by weight or less, based on the weight of the total monomers, of components having a [weight average] molecular weight of 100,000 or less.

5. (Amended) The acrylic pressure-sensitive adhesive as claimed in claim 3, which comprises 6.5% by weight or less, based on the weight of the total monomers, of components having a [weight average] molecular weight of 100,000 or less.

6. (Amended) A process of producing an acrylic pressure-sensitive adhesive comprising: [continuously feeding a monomer mainly comprising at least one alkyl (meth)acrylate, a radical polymerization initiator and carbon dioxide to a continuous reactor through a mixer and]

feeding a monomer solution comprising a mixture of an alkyl (meth)acrylate monomer and a radical polymerization initiator, and carbon dioxide to a joint block equipped with a line mixer;

mixing the monomer solution and carbon dioxide in the joint mixer;

feeding the resulting mixture to a continuous reactor; and

performing continuous bulk polymerization at a polymerization temperature of 50 to 100°C for a residence time of 60 to 200 minutes in a continuous reaction zone of said reactor.

8. (Amended) An acrylic pressure-sensitive adhesive obtained by [the process as claimed in claim 6] a process comprising:

feeding a monomer solution comprising a mixture of an alkyl (meth)acrylate monomer and a radical polymerization initiator, and carbon dioxide to a joint block equipped with a line mixer;

mixing the monomer solution and carbon dioxide in the joint mixer;

feeding the resulting mixture to a continuous reactor; and

performing continuous bulk polymerization at a polymerization temperature of 50 to 100°C for a residence time of 60 to 200 minutes in a continuous reaction zone of said reactor..

9. (Amended) The acrylic pressure-sensitive adhesive as claimed in claim 8, which comprises 10% by weight or less, based on the weight of the total monomers, of components having a [weight average] molecular weight of 100,000 or less.

10. (Amended) The acrylic pressure-sensitive adhesive as claimed in claim 8, which comprises 6.5% by weight or less, based on the weight of the total monomers, of components having a [weight average] molecular weight of 100,000 or less.